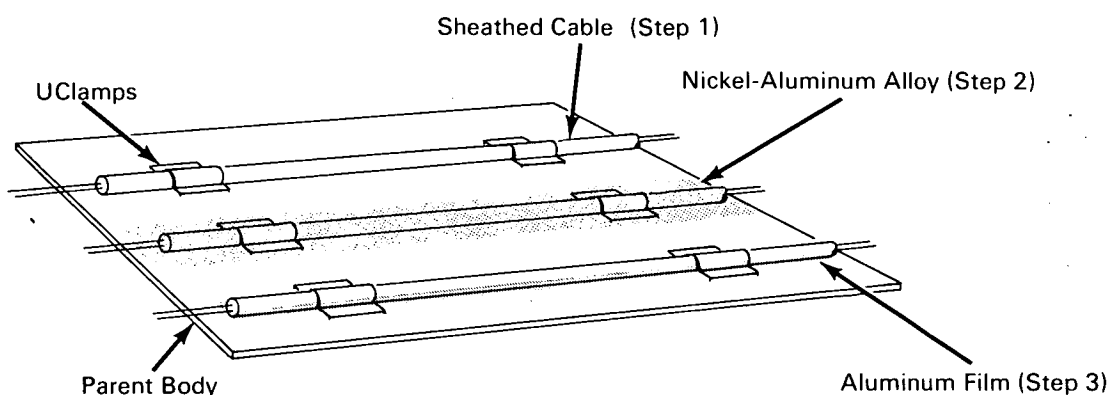


AEC-NASA TECH BRIEF



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Metal Flame Spray Coating Protects Electrical Cables in Extreme Environment



The problem:

Sheathed instrumentation cables were externally attached to cylinders which were cooled on the inside, but exposed to gamma radiation on the outside. The radiation induced high temperatures within the cables, and the resulting temperature differential across the cable diameter produced emf measurement error in the instrumentation system.

The solution:

A spray-on sandwich coating to provide a thermoconductive path for the induced temperature.

How it's done:

Residue materials such as oil and dirt are removed from the cables which are then fastened as shown to the parent body using spot or resistance-welded U-clamps. The cable and parent body are sand blasted with granite or aluminum oxide to remove surface oxides and roughen the surfaces to provide greater bonding area. The interfacing materials are then flame sprayed with 0.002- to 0.005-inch thickness of an aluminum-nickel alloy. A metallurgical bond is thus created, assuring continuous contact even if vibration

is experienced. A narrow film of pure aluminum is then flame sprayed over the entire surface, which becomes the thermoconductive agent between the parent body and sheathed cable.

Notes:

1. For this application the cable sheath was stainless 347 and the parent body was 6061-T6 aluminum.
2. The clamp material should be the same as the parent body; the clamp flats must receive both flame spray coatings.
3. Use of this spray coating dropped the induced temperature in the cable from about 1000°F down to ambient room temperature. EMF error was eliminated.
4. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
AEC-NASA Space Nuclear Propulsion
Office
U.S. Atomic Energy Commission
Washington, D.C. 20545
Reference: B67-10351

(continued overleaf)

Patent status:

No patent action is contemplated by AEC or NASA.

Source: H. A. Fox
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under contract to
AEC-NASA Space Nuclear Propulsion Office
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